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Range Pastures in Alberta

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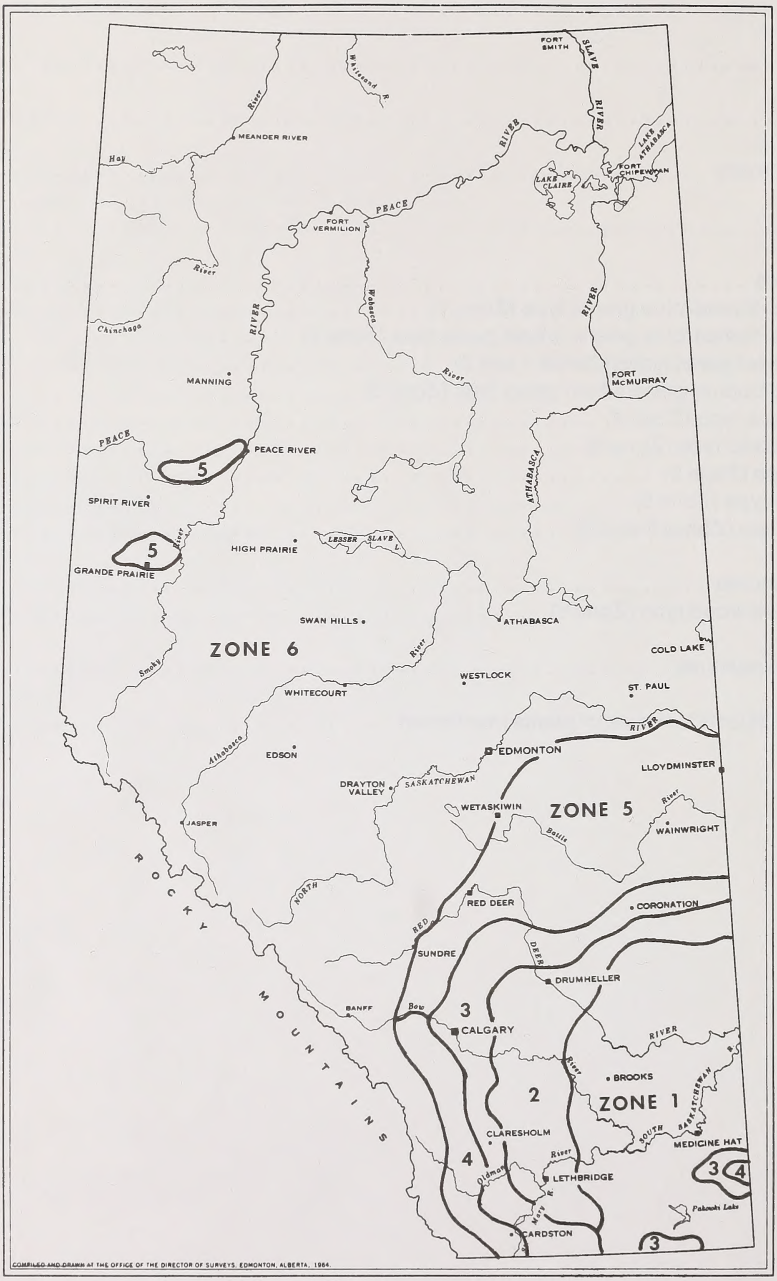

COMPILED AND DRAWN AT THE OFFICE OF THE DIRECTOR OF SURVEYS, EDMONTON, ALBERTA, 1964.

Figure 1. Range vegetation zones in Alberta.

INTRODUCTION

The rangelands of Alberta have always been important to the beef cattle and the sheep industry. These rangelands are not suitable for the growing of grain crops because the land may be too rocky, too rolling or too dry; they are best managed for grazing. The rangelands are also managed for uses other than livestock such as watershed, wildlife, and recreation. It is important that range managers treat the land as a renewable resource and harvest the grass carefully to maintain its long-term productive capacity.

Overgrazing the range causes serious losses to the soil, vegetation, watershed. and wildlife. For livestock producers, overgrazing results in less profit. The plant communities of native grasslands have developed so that plants of the most productive species are most abundant when undisturbed. The forage produced may seem free because no one has spent money to grow it; however, when too much grazing pressure is put on the range, the productive plants will be replaced with plants that are unproductive. When this happens profits will be lost because the carrying capacity is reduced, or money will have to be spent to renovate the rangeland. This is uneconomic, but can be avoided with proper cattle management to keep the range productive.

Native range pastures in Alberta occur within six vegetation zones (figure 1) which may be described as follows: zone 1, needle-and-thread/blue grama type; zone 2, needle-and-thread/blue grama/wheat grass type; zone 3, western porcupine grass/wheat grass type; zone 4, rough fescue type; zone 5, parkland type; and zone 6, woodland type. This publication describes the prairie, woodland, and miscellaneous pastures and provides a guide to stocking rates based on vegetation type and range condition.

In native grasslands, range condition, also called range health, is an indication of how the vegetation compares with the original cover. The greater the proportion of forage provided by the original or 'climax' vegetation, the better the range condition. Range condition, based upon the percentage of forage yield derived from plants of climax species, can be classified as follows:

Excellent — 75 to 100 per cent
Good — 50 to 75 per cent
Fair — 25 to 50 per cent
Poor — 0 to 25 per cent

The most productive native grassland is one with a range condition closest to the original or climax cover. As the plant cover deteriorates from one condition class to another, it produces less forage, and the forage is of poorer quality. For these reasons, ranchers should manage their lands to improve forage condition if it is classed as poor or fair.

In woodland pastures, range condition is based on the current yield of all forage species present relative to the potential yield that could be expected in the forest understory. It is not directly related to plant species.

A range condition rating, which can be related to stocking rate, is given here for most of the native range pastures. Stocking rates are calculated so that range in excellent or good condition will be maintained, while range in fair or poor condition will be improved. Gradually, range in poor condition will be upgraded, first to fair condition and later to good, without drastic reductions in numbers of animals.

Stocking rates given for native range pastures are based on research results from grazing trials, clipping studies, and on local experience. Forage yields are reported on an oven-dry basis and were obtained by harvesting the vegetation on areas protected from grazing during the growing season. Yields of forage on protected or ungrazed fields are generally greater than those on grazed fields. Studies on Mixed Prairie rangeland have shown that protected or unused native prairie produces about two and a half times as much forage as grazed native prairie.

DEFINITIONS

A few definitions[1] are essential so that the remaining discussion may be clearly understood.

Acres Per Animal Unit Month (ac/AUM) — The estimated number of acres necessary to provide forage for one animal unit for one month under proper use.

Animal Unit (AU) — Considered to be one mature 1,000 lb cow or the equivalent based upon average daily consumption of 26 lb of dry matter per day. The animal unit may be adjusted to account for differences in size; for example, a 1250 lb cow should represent 1.25 AU.

Carryover — That portion of the current year's grass growth remaining at the end of the grazing season.

Carrying capacity — The maximum stocking rate possible without causing damage to vegetation or related resources. It may vary from year to year on the same area owing to fluctuating forage production and assumes even livestock distribution and proper forage utilization.

Climax vegetation — The highest ecological development of a plant community capable of perpetuation under the prevailing climatic, edaphic, and biotic conditions.

Decreaser plant species — Plant species of the original or climax vegetation that will decrease in relative amount with continued overuse. Often termed simply decreasers.

Forb — A broad-leaved plant with annual stems.

Increaser plant species — Plant species of the original vegetation that will increase in relative amount, at least for a time, with continued overuse. Commonly called increasers.

Invader plant species — Plant species that are absent from the undisturbed original vegetation but will invade under disturbance or continued overuse. Commonly called invaders.

Range condition — The current productivity of a range relative to what that range is naturally capable of producing.

Range condition class — One of a series of arbitrary categories used to classify range condition and usually expressed as excellent, good, fair, or poor.

Range condition trend — The direction of change in range condition. Also called range trend, trend in range condition, and trend.

Stocking rate — The area of land that the operator has allotted to each animal-unit for the entire grazable period of the year. It may be expressed as a ratio in various forms such as: ac/AU; ac/AUM; AUM/ac; or AU/section.

Utilization cut — A reduction in stocking rate because less productive or underdeveloped sites make up an appreciable part of the pasture, for example, wooded, rocky, barren, or poor or nonexistent water development, or inaccessible areas.

Vegetation type — A plant community typified by an association of species different from that of other habitats.

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[1] *From "A Glossary of Terms Used in Range Management" published by Society for Range Management. Denver, Colorado, 1974.*

FENCELINE CONTRASTS

Variation in productivity of a vegetation type can be observed by comparing adjoining areas, particularly where fenceline contrasts exist.

Fenceline contrasts (figure 2) occur when adjoining areas of similar soil and slope have been treated differently. For example, a fence may separate an ungrazed road allowance from an overgrazed pasture. The ungrazed road allowance shows how the range could look under good management practices; the overgrazed pasture shows what poor management has done to the range. Overutilization in one year will also provide fenceline contrasts but the productivity may not yet be affected.

Research has shown that ungrazed range is closer to the original cover than grazed range. Thus, areas protected from grazing are used to indicate how range in an area should look when in a productive state. Range can be managed so that it is maintained in good to excellent condition with most of the original cover species still present.

Ungrazed woodland pastures show the kind and number of species that are present in the understory; examination of grazed woodland pastures shows how management has affected the species composition.

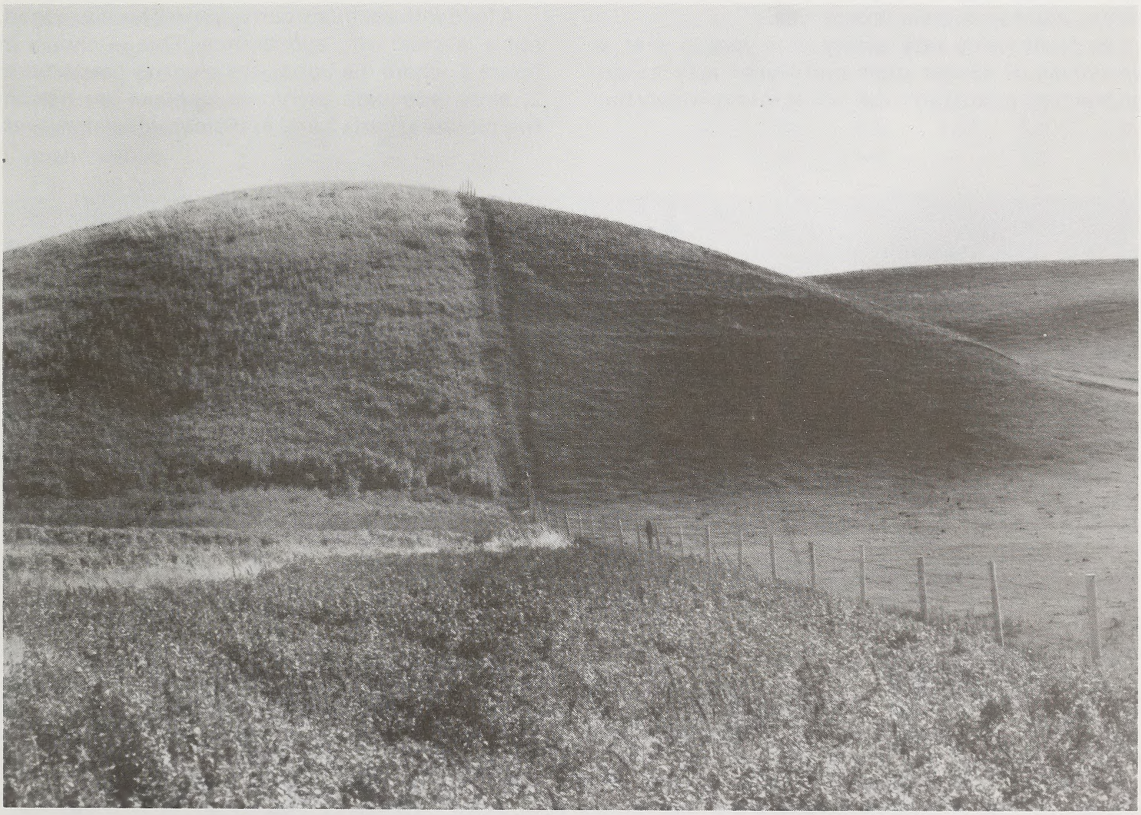

Figure 2. Fenceline contrast in the Fescue Prairie area. A comparison of both sides of the fence will provide much information about the vegetation.

CARRYOVER

Carryover is necessary to maintain the grass plants in a productive condition. On summer ranges, it should be about 45 per cent of the current year's growth of grass. About half the leaves should be left to manufacture food reserves, which are stored in the roots and crowns. Such food reserves ensure continuing vigor, productivity, and longevity.

Carryover also traps some snow and increases soil moisture. It protects the crowns of plants and allows for the production of leaves. Carryover is easily seen and may be used as one indicator of range condition. Carryover is particularly important on Mixed Prairie rangeland to conserve soil moisture by reducing soil temperature and water evaporation, and to maintain forage yields.

As plant yields vary widely from year to year, a carryover of 45 per cent every year may be an impractical goal. Carryover will also vary widely but should average about 45 per cent over a period of years in a stable livestock operation. Carrying capacities are set to take drought conditions into account. In dry years, grazing may leave less than 45 per cent carryover, but the range will remain vigorous during wet years when growth and carryover are high.

Carryover is not as important on winter pastures as on summer pastures because all necessary food has been stored in the roots before grazing. Stocking rates can be increased if grazing is limited to the dormant season, although removing too much leaf material will lower the accumulation of plant litter and subsequent plant growth.

A field with adequate carryover will have a ragged, not a 'slicked off', appearance. This is shown in figure 3, where the upper two pictures (parts 1 and 2) show adequate carryover whereas the bottom two pictures (parts 3 and 4) indicate little carryover.

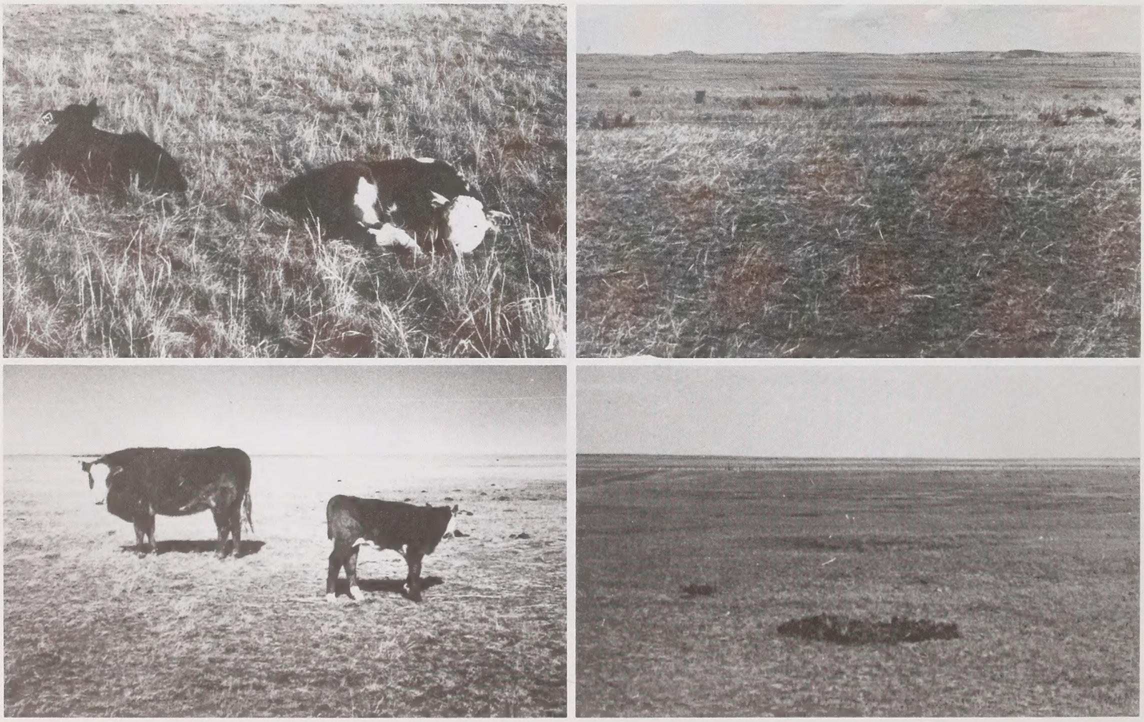

Figure 3. Carryover on Mixed Prairie at Manyberries. Amount of carryover is estimated as (part 1) 75 per cent, (part 2) 45 per cent, (part 3) 25 per cent, and (part 4) 5 per cent of the current year's growth of grass.

Table 1. Percentage ground cover, estimated mean yields, and carrying capacities at six selected sites in two grassland associations[1]

Plant species or other item	Mixed Prairie				Fescue Prairie	
	Needle-and thread/blue grama type		Needle-and thread/blue grama/wheat grass type		Rough fescue type	
Site	1	2	3	4	5	6
Grasses and sedges:						
Blue grama	4.1	7.3	1.8	2.0	—	—
Needle-and-thread	0.7	1.3	1.4	0.4	—	—
Sandberg's blue grass	1.0	0.8	0.5	—	—	—
June grass	0.5	1.0	0.9	1.0	0.4	1.2
Western wheat grass	1.4	0.7	0.7	0.6	1.6	0.7
Sun-loving sedge	0.5	1.7	1.5	1.6	1.3	2.2
Western porcupine grass	—	P	1.9	2.4	2.6	0.1
Northern wheat grass	—	P	0.8	0.5	1.1	0.6
Rough fescue	—	—	0.5	1.6	3.2	4.6
Idaho fescue	—	—	—	—	0.1	1.1
Parry oat grass	—	—	—	—	—	5.0
Other grasses and sedges	0.4	1.1	1.1	0.4	2.1	1.2
Forbs and shrubs:						
Pasture sage	0.5	0.7	1.6	2.5	P	—
Moss phlox	0.2	0.5	0.2	0.4	—	—
Rose	—	P	0.2	0.1	0.9	0.2
Western snowberry	—	P	0.1	0.1	0.4	0.2
Old man's-whiskers	—	—	P	P	0.6	0.3
Silvery lupine	—	—	—	—	0.1	0.4
Shrubby cinquefoil	—	—	—	—	0.2	1.3
Other forbs and shrubs	0.7	0.4	1.2	1.1	3.5	3.6
Little club moss	6.5	8.7	3.2	4.1	0.8	P
Estimated yield: lb DM per acre	315	400	500	650	800	1250
Carrying capacity acres per A.U.M.	4.5	3.5	2.8	2.2	1.8	1.1

[1] From: Management of the prairie rangeland. Agr. Can. Publ. 1589/E. 1982.
P = present in small amounts.

The vegetation types in zones 1, 2, and 3 (figure 1) make up the Mixed Prairie. This grassland association contains six important grass species: needle-and-thread, western porcupine grass, blue grama, northern wheat grass, western wheat grass, and June grass. The vegetation type in zone 4 is dominated by rough fescue and constitutes the Fescue Prairie. The combination of grassland and trees in zone 5 is called Aspen Parkland.

Four vegetation types within the Mixed Prairie are illustrated in this publication. Each vegetation type includes two or three dominant species. All these vegetation types blend into one another and many combinations are possible (table 1).

The needle-and-three/blue grama type occurs on medium- and coarse-textured soils in the Brown soil zone, as well as on sandy loam soils that are solonetzic, and on exposed sites throughout southern Alberta.

The needle-and-thread/blue grama/western wheat grass type is a more productive vegetation type. It occurs on medium-textured soils in the moister parts of the Brown soil zone and the drier parts of the Dark Brown soil zone.

The western wheat grass type occurs on clay soils of old lake beds and usually contains June grass. When these soils are alkaline, western wheat grass alone may be dominant. Western wheat grass, with blue grama and cactus, is found on clay loam solonetzic soils (burn-outs) of the drier parts or the Brown soil zone.

The western porcupine/wheat grass type is present throughout the Dark Brown soil zone and the moist adjacent parts of the Brown soil zone. Other species of needle grass may be abundant locally.

The rough fescue type occupies the Black soil zone and parts of the Dark Brown and Grey Wooded soil zones. Rough fescue, which may be dominant or occur as a co-dominant with western porcupine grass, may be found growing with Parry oat grass, Idaho fescue, wheat grass, and June grass. Weedy plants include silvery lupine, shrubby cinquefoil, western snowberry, and rose.

The aspen parkland type is a mosaic of grassland and groves of aspen and willow. It is transitional between prairie and forest. The grassland, which is typically rough fescue prairie, occupies drier areas; trees occupy the moister and more sheltered places. Ths aspen parkland type includes the sandhill and the river slope vegetation types.

Needle-and-Thread/Blue Grama Type (Zone 1)

These grasslands occur where the average annual precipitation is 250-350 mm (10 to 14 inches) and evaporation from a free water surface is 750 mm (30 inches) or more. They have been called "The Shortgrass Plains". The grasses are high in nutritive value, and because they cure on the stem, can provide winter grazing for livestock. Within zone 1, snowfall is light and the winters are usually open. Chinook winds moderate the winter weather but may produce icing conditions on the pastures. In summer, these winds cause rapid loss of soil moisture.

Needle-and-thread and blue grama have the highest ground cover although other grasses may be dominant locally. Needle-and-thread is abundant on deep loam soils. Thread-leaved sedge is abundant on eroded sites and hillsides.

Overgrazing reduces needle-and-thread, June grass, and western wheat grass. Blue grama and Sandberg's blue grass increase as do pasture sage, broomweed, cactus, moss phlox. and other weedy plants. The first evidence of overgrazing is a lower yield of forage as the productive medium-tall (midgrasses) disappear. This is followed by an increase in weedy species and a further reduction in carrying capacity.

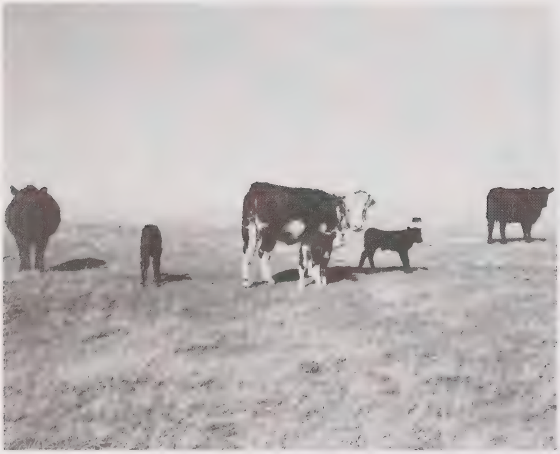

Figure 4. Needle-and-thread/blue grama type in good condition. Productive range with needle-and-thread and blue grama dominating the cover.

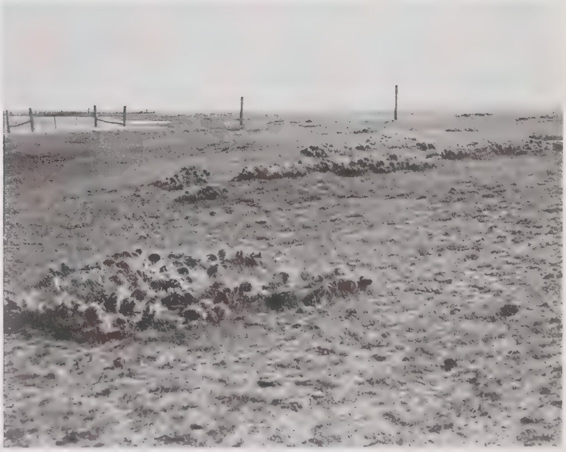

Figure 5. Needle-and-thread/blue grama in fair condition. Blue grama is dominant, but cactus is very common.

Native Vegetation

Decreasers	Increasers	Invaders
Needle-and-thread	Blue grama	Russian thistle
Northern wheat grass	June grass	Foxtail barley
Western wheat grass	Sandberg's blue grass	Gumweed
Green needle grass	Thread-leaved sedge	Broomweed
Winter fat	Pasture sage	Dandelion
Nuttall's atriplex	Moss Phlox	Goosefoot
Forb decreasers	Little club moss	Goat's-beard
	Cactus	Other annuals
	Sagebrush	

Forage Yields

Forage yields, in pounds of dry matter per acre, and average stocking rates, in acres per animal unit month and per animal unit per year, for the four condition classes are:

	Excellent	Good	Fair	Poor
Average yield, lb	375	300	225	150
Range in yield, lb*	300-600	200-500	150-400	100-300
Stocking rate:				
Acres per month	3.8	5.0	6.3	9.5
Acres per year	45	60	75	115

*The wide range in forage yields results from the extreme variations in moisture conditions.

Needle-and-Thread/Blue Grama/Wheat Grass Type (Zone 2)

Mid-grasses, intermediate in height between tall and short growing grasses, are abundant in these grasslands. About 70 per cent of the total vegetation is needle-and-thread, western porcupine grass, blue grama, and the wheat grasses.

With care, the mid-grasses can be maintained in the pasture. As pastures are overused, the mid-grasses disappear and blue grama increases. With continued overuse, pasture weeds increase, especially pasture sage, moss phlox, and broomweed.

Annual precipitation is between 250 and 350 mm (10 and 14 inches); evaporation is between 625 and 750 mm (25 and 30 inches).

Native Vegetation

Decreasers	Increasers	Invaders
Needle-and-thread	Blue grama	Foxtail barley
Western wheat grass	Sandberg's blue grass	Cheat grass
Western porcupine grass	June grass	Gumweed
Green needle grass	Plains reed grass	Broomweed
Nothern wheat grass	Prairie muhly	Dandelion
Winter fat	Sedge	Russian thistle
Forb decreasers	Pasture sage	Goosefoot
	Sagebrush	Goat's-beard
	Moss phlox	Other annuals
	Little club moss	
	Cactus	
	Forb increasers	

Forage Yields

Forage yields, in pounds of dry matter per acre, and average stocking rates, in acres per animal unit month and per animal unit per year, for the four condition classes are:

	Excellent	Good	Fair	Poor
Average yield. lb	525	425	325	225
Range in yield, lb	350-1000	300-750	225-550	175-300
Stocking rate:				
Acres per month	2.7	3.3	4.3	6.3
Acres per year	32	40	50	75

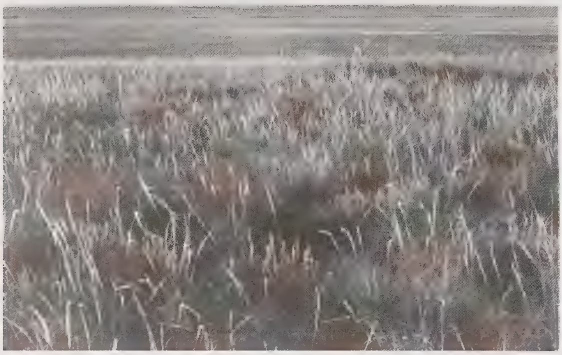

Figure 6. Needle-and thread/blue grama/wheat grass type in excellent condition. Mid-grasses dominate the range and there are few weeds.

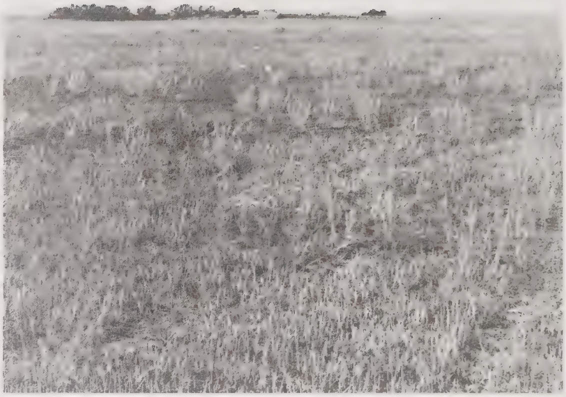

Figure 7. Needle-and thread/blue grama/wheat grass type in poor condition. Cover has deteriorated to remnants of grass, with annual and perennial weeds.

Western Wheat Grass Type (Zones 1 and 2)

These grasslands occur on a variety of soils but are most commonly found on clay soils that are flooded in spring. Many are used as native hay meadows. Where there is no salinity, June grass is an associated species. Blue grama and western wheat grass grow on clay solonetzic soils in southeastern Alberta. With overuse, cactus may become abundant on these soils. Both western and northern wheat grasses may be dominant on upland clay soils where green needle grass is often a co-dominant.

These grasslands are productive, especially as native hay meadows. Since stock tend to concentrate on these areas, careful management is needed to keep them in good condition.

Native Vegetation

Decreasers	Increasers	Invaders
Western wheat grass	Blue grama	Foxtail barley
Western porcupine grass	June grass	Gumweed
Needle-and-thread	Sandberg's blue grass	Broomweed
Green needle grass	Sedge	Goat's-beard
Slender wheat grass	Pasture sage	Other annuals
Northern wheat grass	Cactus	
Winter fat	Rose	
Forb decreasers	Sagebrush	
	Greasewood	

Forage yields

Forage yields in pounds of dry matter per acre, and average stocking rates, in acres per animal unit month and per animal unit per year, for the four condition classes are:

	Excellent	Good	Fair	Poor
Average yield, lb	675	525	425	300
Range in yield, lb	400 - 1100	350 - 950	300 - 750	225 - 450
Stocking rate:				
Acres per month	2.1	2.7	3.3	4.7
Acres per year	25	32	40	55

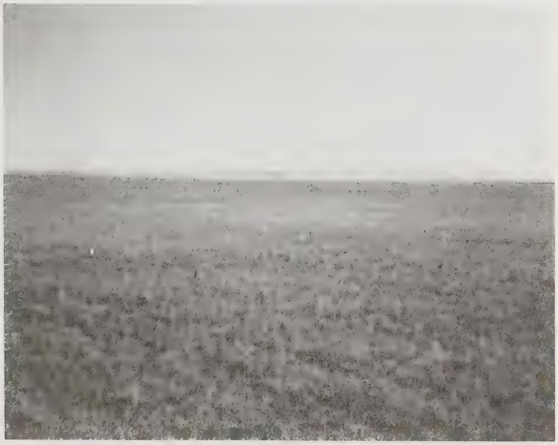

Figure 8. Wheat grass type in good condition. Cover is grassy and is mostly wheat grasses; green needle grass or June grass may be common.

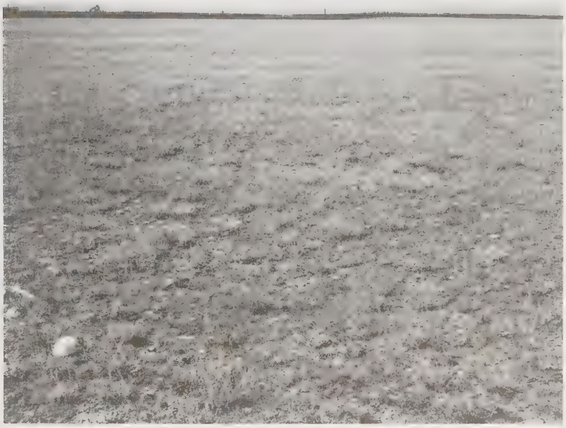

Figure 9. Wheat grass type in fair condition. Only small amounts of the wheatgrasses remain, often considerable blue grama and shrubby plants.

Western Porcupine Grass/Wheat grass Type (Zone 3)

These grasslands occupy moister sites in the Brown and Dark Brown soil zones. They tend to be transitional between the Mixed Prairie and the Fescue Prairie and are difficult to assess. The original grasslands were dominated by western porcupine grass with varying amounts or northern and western wheat grasses, June grass, rough fescue, and, on sandy soils, blue grama. Low-growing species such as blue grama, sedge, and June grass as well as pasture sage and other shrubs become abundant on overgrazed range.

The western porcupine grass/wheat grass type was the most favorable area open to settlement; today most is farmed. Only the stony, sandy, or rough portions are grazed.

Annual precipitation is between 350 mm and 450 mm (14 and 18 inches) and evaporation is between 500 and 650 mm (20 and 25 inches).

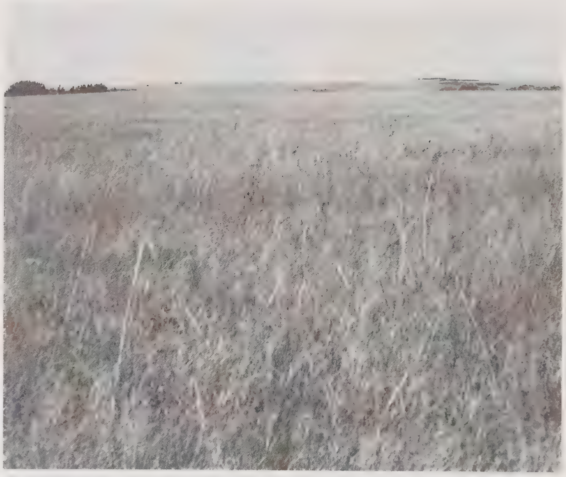

Figure 10. Western porcupine grass/wheat grass type in good condition. Needle-and-thread is also important in the cover, few weedy plants are evident.

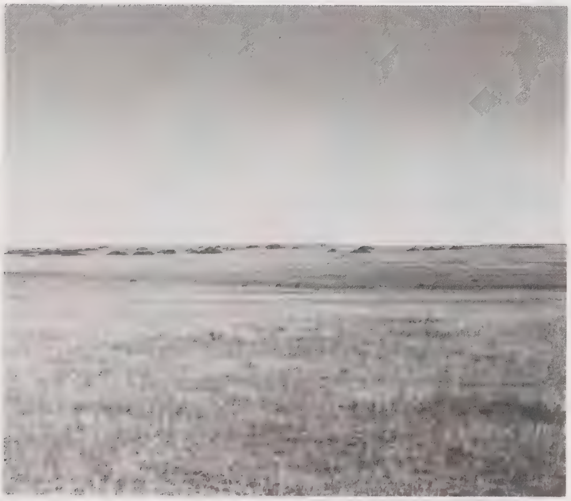

Figure 11. Western porcupine grass/wheat grass in poor condition. Blue grama, broomweed, pasture sage and other weedy plants now make up most of the cover.

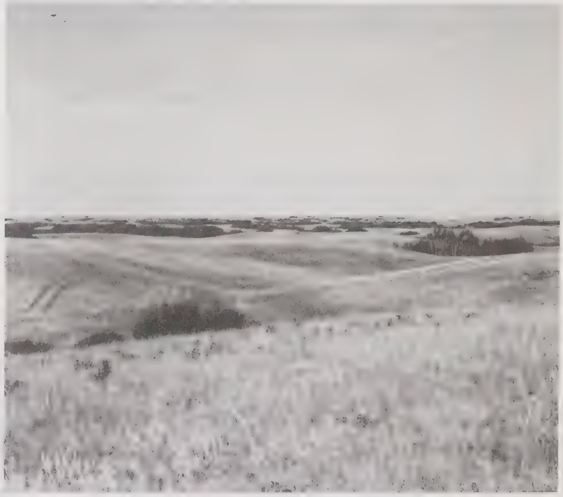

Figure 12. Western porcupine grass/wheat grass on southern exposure (foreground) and rough fescue on northern slope (background). This forms a transition between prairie and parkland.

Native Vegetation

Decreasers	Increasers	Invaders
Western porcupine	Blue grama	Kentucky blue grass
Northern wheat grass	June grass	Pepper grass
Western wheat grass	Sedge	Gumweed
Rough fescue	Pasture sage	Goat's-beard
Canada wild rye	Rose	Dandelion
Brome	Western snowberry	Canada thistle
Green needle grass	Moss phlox	Leafy spurge
Forb decreasers	Little club moss	Other annuals

Forage Yields

Forage yields, in pounds of dry matter per acre, and average stocking rates, in acres per animal unit month and per animal unit per year, for the four condition classes are:

	Excellent	Good	Fair	Poor
Average yield. lb	725	600	425	325
Range in yield. lb	450 - 1450	350 - 1050	300 - 800	250 - 550
Stocking rate:				
Acres per month	2.0	2.4	3.3	4.3
Acres per year	24	28	40	50

Rough Fescue Type (Zone 4)

These grasslands are distinguished by the presence of rough fescue. Fescue Prairie is found in the foothills, other hilly areas, and over much of the Black soil zone. Only the stony, sandy, or hilly portions are grazed; the rest is farmed.

Rough fescue is sensitive to spring and summer grazing and disappears when used heavily. Thus the presence of rough fescue indicates good condition. In the southern foothills under continuous heavy grazing, rough fescue is replaced by Parry oat grass, Idaho fescue, wheat grass, and June grass. Prolonged misuse results in a cover of weeds, including pasture sage, shrubby cinquetoil, pussy-toes, and annuals. In the northern area, with continued heavy grazing, rough fescue is replaced by western porcupine grass, wheat grass, June grass, blue grass, sedge, and various weedy species.

Annual precipitation is between 450 and 550 mm (18 and 22 inches) and evaporation is between 380 and 500 mm (15 and 20 inches).

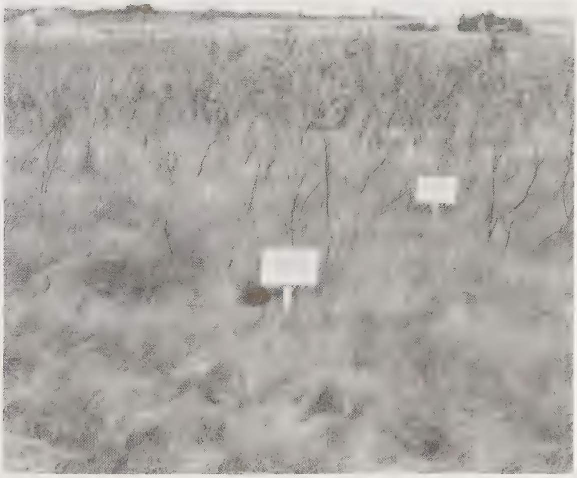

Figure 13. Fescue Prairie in excellent condition. Cover is mostly grass although some shrubs are present.

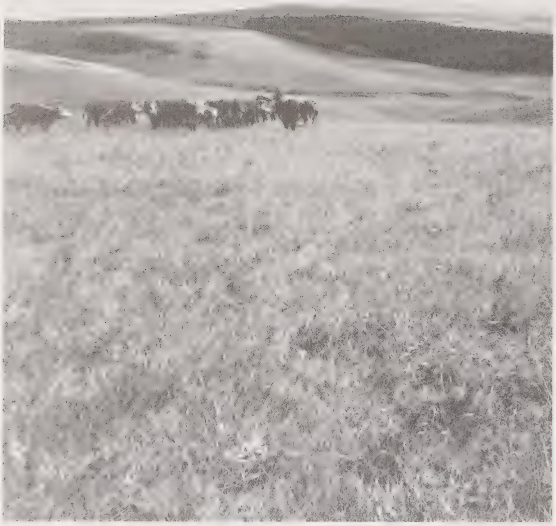

Figure 14. Fescue Prairie in good condition. Rough fescue is a co-dominant with Parry oat grass in southern foothills, with western porcupine grass elsewhere. Few weedy plants evident.

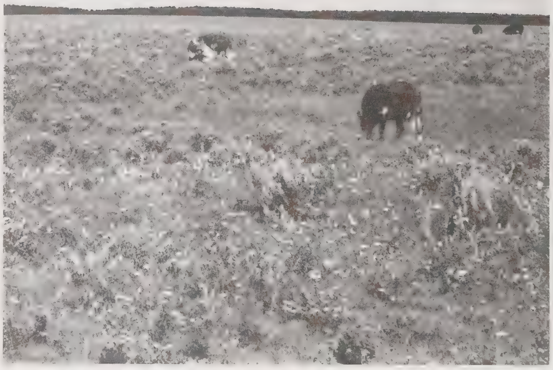

Figure 15. Fescue Prairie in poor condition. Rough fescue and other mid-grasses have been replaced by weedy plants that now make up most of the cover.

Native Vegetation

Decreasers	Increasers	Invaders
Rough fescue	Parry oat grass	Kentucky blue grass
Columbia needle grass	Intermediate oat grass	Timothy
Richardson's needle grass	Idaho fescue	Foxtail barley
Western porcupine grass	Western wheat grass	Dandelion
Awned wheat grass	Needle-and-thread	Goat's-beard
Canada wild rye	June grass	Other annuals
Mountain brome	Plains reed grass	
Nuttall's alkali grass	Tufted hair grass	
Forb decreasers	Western snowberry	
Woody decreasers	Pasture sage	
	Shrubby cinquefoil	
	Other woody plants	
	Forb increasers	

Forage Yields

Forage yields, in pounds of dry matter per acre, and average stocking rates, in acres per animal unit month and per animal unit per year, for the four condition classes are:

	Excellent	Good	Fair	Poor
Average yield, lb	1200	950	725	525
Range in yield, lb	1000 - 2150	750 - 1600	525 - 1050	350 - 750
Stocking rate:				
Acres per month	1.2	1.5	2.0	2.7
Acres per year	15	18	24	32

Aspen Parkland Type (Zone 5)

The Aspen Parkland extends as a narrow band along the foothills, north to Red Deer then northeastward across the south-central part of the province. The area is interspersed with numerous small sloughs and much of it, because of hilly topography, is being grazed. Aspen Parkland also occurs in the Peace River area where the grassland belongs to a wheat grass/needle grass type.

The grassland portion of the Aspen Parkland is predominantly Rough Fescue Prairie. With continued heavy grazing, rough fescue is replaced by wheat grass, western porcupine grass, June grass, blue grass, and sedge. With heavy use, the forb cover of goldenrod, fringed sage, and moss phlox also increases. Shrubs, common on overgrazed areas, are rose, western snowberry, and wolf-willow.

The aspen groves have a shrub layer of dogwood, chokecherry, saskatoon, rose, and western snowberry. Where water is abundant, willows form more or less pure thickets. With the suppression of natural wildfires, trees are gradually encroaching upon the grassland.

Annual precipitation is between 400 and 550 mm (16 and 22 inches) and evaporation is between 380 and 500 mm (15 and 20 inches).

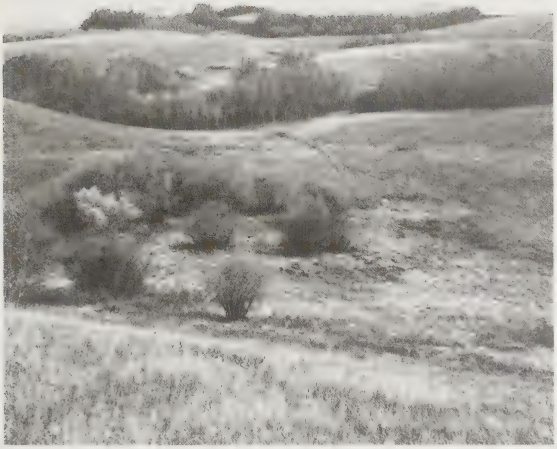

Figure 16. Parkland in excellent condition. Prairie is very productive with rough fescue and western porcupine grass dominating the cover. Willows and aspen occupy less than 25 per cent of the grazing area.

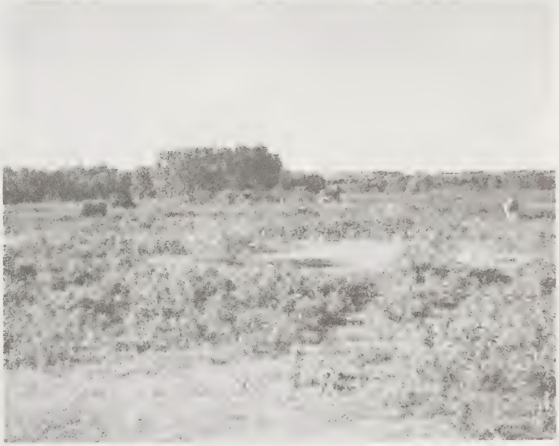

Figure 17. Parkland in poor condition. Productive grasses have been replaced by bluegrass and western snowberry. Willow and aspen occupy 25 to 35 per cent of the grazing area.

Native Vegetation

Decreasers	Increasers	Invaders
Rough fescue	Parry oat grass	Kentucky blue grass
Western Porcupine grass	June grass	Smooth brome
Green Needle grass	Slender wheat grass	Foxtail barley
Hooker's oat grass	Needle-and-thread	Dandelion
Awned wheat grass	Blue grass	Goat's-beard
Nodding brome	Western snowberry	Other annuals
Hairy wild rye	Pasture sage	
Peavine	Other woody plants	
Forb decreasers	Forb increasers	
Woody decreasers	Sedge increasers	

Forage Yields

Forage yields, in pounds of dry matter per acre, and average stocking rates, in acres per animal unit month and per animal unit per year, for the four condition classes are:

	Excellent	Good	Fair	Poor
Average yield, lb	725	525	375	275
Range in yield, lb	600 - 1850	400 - 1250	325 - 950	150 - 650
Stocking rate:				
Acres per month	2.0	2.5	3.8	5.0
Acres per year	24	30	45	60

Sandhill Type (Zone 5)

Within the Aspen Parkland zone there are significant tracts of the parkland sandhill type. Soils and vegetation have developed on coarse textured sands which the prevailing winds have shaped into rolling or ridged sand dunes. Although this type is within the Black soil zone, soils are very shallow and plant cover and productivity vary significantly with aspect and slope position.

Rough fescue-sedge-porcupine grass and rough fescue-sand grass associations are most common. Forbs are far less abundant in this type owing to the very dry nature of the soils.

The stable upper slopes of dunes are dominated by sedge, sand grass, creeping juniper, and little club moss. Stunted poplar, rose and forbs like goldenrod and golden bean, may invade grasslands from north-facing slopes. Canada wild rye, sand grass, sedge, and scurf pea are present in active blowout areas. Rough fescue, sedge and western porcupine grass are common on lower slope swales between the dunes. This type must be carefully managed to prevent a loss of plant cover which would allow wind erosion.

Native Vegetation

Decreasers	Increasers	Invaders
Rough fescue	Sedge	Canada thistle
Western porcupine grass	Goldenrod	Stinkweed
Sand grass	Golden bean	
Canada wild rye	Creeping juniper	
Awned wheat grass	Scurf pea	
	Pasture sage	
	June grass	
	Little club moss	

Forage Yields

Forage yields, in pounds of dry matter per acre, and average stocking rates, in acres per animal unit month and per animal unit year, for the four condition classes are:

	Excellent	Good	Fair	Poor
Average yield, lb	325	250	175	125
Range in yield, lb	250 - 850	175 - 500	125 - 300	50 - 200
Stocking rate:				
Acres per month	4.3	5.5	8.0	11.7
Acres per year	50	65	95	140

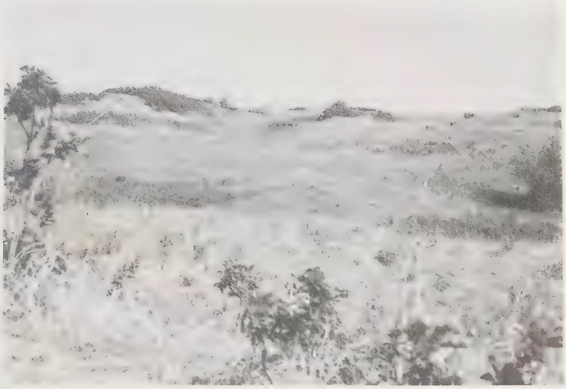

Figure 18. Sandhills. These areas often support woody vegetation because of the permeability of the soil; active sand dunes may be present. These need careful management to avoid wind erosion and may be stocked at 5 or more acres per AUM.

River Slope Type (Zone 5)

River slope grasslands are common along the exposed south-facing slopes of the Peace River and its tributaries in northern Alberta. Although growing season precipitation averages 300 mm (12 inches), these south-facing grasslands are similar to the Mixed Prairie of southern Alberta. Western porcupine grass, green needle grass, thread-leaved sedge and milk-vetch are predominant. These grasslands are commonly interspersed with the dense shrub cover of saskatoon, rose, and chokecherry as well as bluffs or aspen poplar. Nothern and western wheat grass become dominant with moderate grazing. Heavy grazing favors a further shift to thread-leaved sedge, June grass, pussy-toes, and pasture sage.

These grasslands must be managed carefully to sustain grazing. They should be fenced separately from the uplands and grazed at a proper stocking rate in late summer or fall. Livestock should be removed from river slope grasslands when soils are wet and most vulnerable to trampling damage.

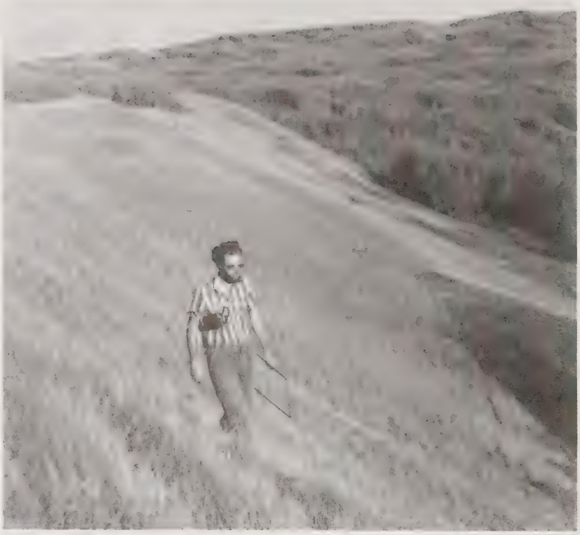

Figure 19. Excellent condition river slope grassland. Productive range vegetation is dominated by western porcupine grass and green needle grass.

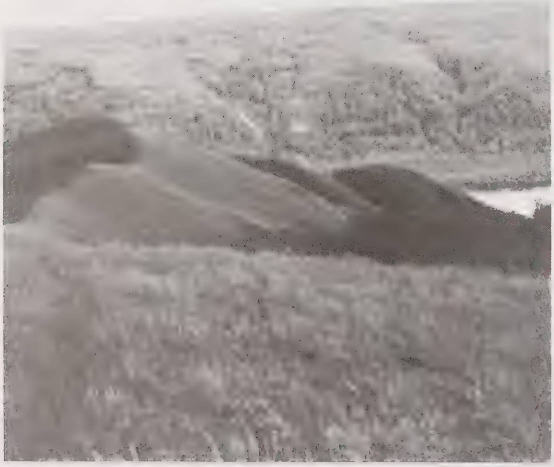

Figure 20. Fair condition river-slope grassland. The plant cover is dominated by pasture sage and sedges.

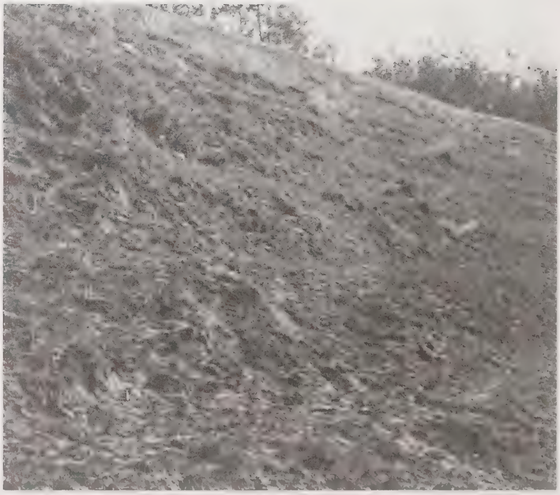

Figure 21. Poor condition river-slope grassland. This grass land is easily damaged by heavy spring grazing.

Native Vegetation

Decreasers	Increasers	Invaders
Western porcupine grass	Western wheat grass	Stinkweed
Green needle grass	Northern wheat grass	Dandelion
Awned wheat grass	Thread-leaved sedge	Canada thistle
Nodding onion	Blue grass	
Vetch	June grass	
	Pasture sage	
	Northern bedstraw	
	Pussytoes	
	Yarrow	
	Prairie crocus	

Forage Yields

Forage yields, in pounds of dry matter per acre, and average stocking rates, in acres per animal unit month and per animal unit year, for the four condition classes are:

	Excellent	Good	Fair	Poor
Average yield, lb	1200	675	375	200
Range in yield, lb	1000 - 2000	550 - 950	250 - 750	150 - 400
Stooking rate:				
Acres per month	1.2	2.1	3.8	7.0
Acres per year	15	25	45	85

Shoreline Type (Zones 5 and 6)

Shoreline vegetation growing alongside lakes and large sloughs can provide a valuable forage for livestock in the Aspen Parkland and boreal mixed wood areas. It produces early spring forage that can be grazed after mid-May. Grazing the shoreline grasses before heading can result in overuse while grazing after heading can shift anticipated use onto upland vegetation types and cause overgrazing. Shoreline types usually have a high trampling and hummocking potential because of the wet soils. Overgrazing and trampling of shorelines result in the loss of good forage and invasion of foxtail barley.

Large areas of shoreline may be fenced separately from upland vegetation to promote better utilization and maintain these areas in good range condition. Upland vegetation types may be grazed two to three weeks after shoreline grazing.

Water hemlock is a poisonous plant common to shorelines. It is among the earliest plants to begin growth in spring before other palatable forage is available. Therefore, to reduce risk of hemlock poisoning, stock should not be allowed to graze on shorelines before mid-May.

Native Vegetation

Decreasers	Increasers	Invaders
Beaked sedge	Sedge increasers	Foxtail barley
Sedge decreasers	Northern reed grass	Kentucky blue grass
Whitetop	Narrow reed grass	Canada thistle
Reed canary grass	Nuttall's alkaki grass	Sow thistle
Tall manna grass	Fowl blue grass	
Tufted hair grass	Rough hair grass	
Sweet grass	Water foxtail	
Glaucous blue grass	Northern bent grass	
	Cinquefoil	
	Baltic rush	
	Silverweed	
	Common plantain	
	Willow	

Forage Yields

Forage yields, in pounds dry matter per acre, and average stocking rates in acres per animal unit month and per animal unit per year, for the four condition classes are:

	Excellent	Good	Fair	Poor
Average yield, lb	1900	1675	1450	950
Range in yield, lb	1500 - 3000	1200 - 2500	1000 - 2100	600 - 1600
Stocking rate:				
Acres per month	0.75	0.85	1.0	1.5
Acres per year	9	10	12	18

WOODLAND PASTURES

These pastures occur in zone 6, the extensive northern forest that stretches northward from about the North Saskatchewan River. Tree cover includes white spruce which forms the climax vegetation, and willow, poplar, and pine. The height and density of the trees and the resultant shading effect limit the growth of grass and other forage plants. Although some brush is valuable as shelter, utilization cuts are made when more than one-tenth of the area is wooded. The boreal mixed wood is one woodland pasture type.

Boreal Mixed Wood Type

These forest rangelands occur north and west of the Aspen Parkland, and east of the treed foothills. Annual precipitation is between 350 and 430 mm (14 and 17 inches). Approximately 70 per cent of the total moisture is received during the summer months. Available forage growth does not begin until about mid-June and slows with frosts in mid-August.

Mixed wood pastures contain a variety of dry, moist, depressional, and peatland sites which produce environments for a wide spectrum and diversity of forest habitats (table 2). Upland topography varies from level to rolling. Most slopes are less than 30 per cent.

The recommended stocking rates of mixed wood pastures (table 2) vary significantly between and within habitats depending on soil conditions, overstory species (jack pine, aspen/balsam poplar, or white spruce), amount of overstory canopy opening, tree density, fire and logging history. Understory forage yields decline as young forests grow taller and the canopy closes. As this happens, less light, nutrients, and space are available for the growth of grasses, forbs, and shrubs. On moist upland sites, aspen and balsam poplar forests may be replaced by a white spruce forest which further reduces forage yields.

Fires and logging reverse the succession and provide higher yields of grasses, forbs and shrubs. Moderate livestock use can maintain forage yields by keeping the tree canopy in a sapling stage and by maintaining openings.

Table 2 describes four major forest sites and 12 major forest habitats that commonly occur in a mixed wood area. Forage production within a habitat is highly variable and access to forage and water may be restricted. These factors should be considered when setting the stocking rate in such an area. Large mixed wood pastures may be cross-fenced into individual management units, and trail systems and watering facilities could be developed for better distribution and utilization.

In mixed wood pastures, moist upland sites with open understories, burned over or logged areas, willow-sedge-reed grass depressions, shorelines of lakes and slough edges usually receive moderate to heavy use and are susceptible to overgrazing. The jack pine-aspen and open white spruce-poplar areas usually receive lowest use, some habitats are unusable because of the presence of grazing barriers and their low production of forage of a poor quality. Examples are the black spruce-tamarack muskegs, labrador tea-birch bogs, sedge fens, jack pine-bearberry and dense white spruce stands with a stocking rate greater than 10 acres/AUM. These areas are best left ungrazed.

Indicators of overgrazing in the mixed wood pastures are the loss of desirable plants such as saskatoon, dogwood, low-bush cranberry, peavine, vetch, rice grass, and awned wheat grass. Since legume species are most susceptible to grazing pressure the pasture should be managed to maintain these species. When the legume species begin to disappear then the pasture is overgrazed.

Mixed wood pastures can best be grazed from mid-June to mid-August. Early spring use should be avoided until the grasses are from 10 to 15 cm (four to six inches) tall. If poisonous plants such as larkspur are present, grazing should be avoided until after mid-August when the danger of poisoning is reduced.

Because the grazing season on the mixed wood pastures is short, tame pastures should be established to provide grazing in spring and fall. This can increase the grazing season to about five or six months. Tame pastures must be fenced in order to separate them from the mixed wood pastures and allow for optimum utilization.

Native Vegetation

Decreasers	Increasers	Invaders
Awned wheat grass	Yarrow	Dandelion
Rice grass	Pussytoes	Canada thistle
Hairy wild rye	Bunchberry	Kentucky blue grass
Northern reed grass	Wintergreen	Foxtail barley
Sedge	Dewberry	
Aster	Solomon's seal	
Peavine	Bog cranberry	
Saskatoon	Bearberry	
Low-bush cranberry	Honeysuckle	
Dogwood	Alder	
Hazelnut	Low juniper	
Vetch	Plantain	
	Silverweed	

Table 2. Stocking rates of boreal mixed wood pastures

Site factors	Forest habitat	Tree canopy/ site conditions	Stocking rate (acres/AUM)
Dry	Jack pine-bearberry	Open to semi-open	Nil
	Jack pine-aspen-hairy wild rye	Open to semi-open	6.7 to 10+
Moist	Aspen-balsam poplar	Open to semi-open with scattered pine, spruce, and willow	4 to 6
	White spruce-poplar	Semi-open conifer-deciduous mixture	60 to 10+
	White spruce	Closed	Nil
	Burned or logged area with 3-5 year controlled burns	Open, scattered aspens, saplings	2 to 4
Depressional	Willow-sedge-reed grass	Scattered willow	1 to 2
	Slough edges	Spring flooded	1 to 2
Lake shorelines	Standing water absent during grazing season		.85 to 2
Peatlands	Black spruce-tamarack Labrador tea-birch, Sedge fens, bogs, swamps, and marshes	Grazing barriers such as access, hummocky peat, standing water, and poor feed	Nil

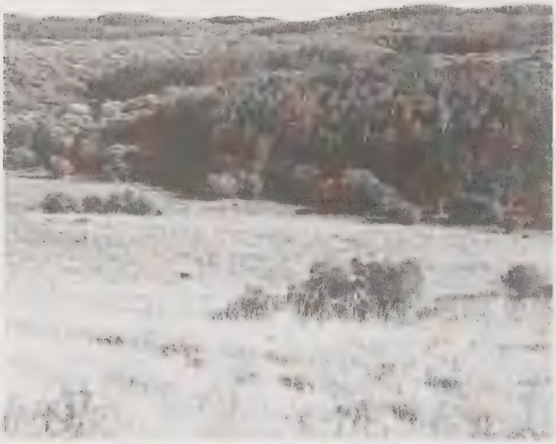

Figure 22. Woodland pasture: carrying capacity — 2.7 acres per AUM. Willow, aspen, and poplar occupy 25 to 50 per cent of the grazing area. The remainder is open grassland of the Fescue Prairie type.

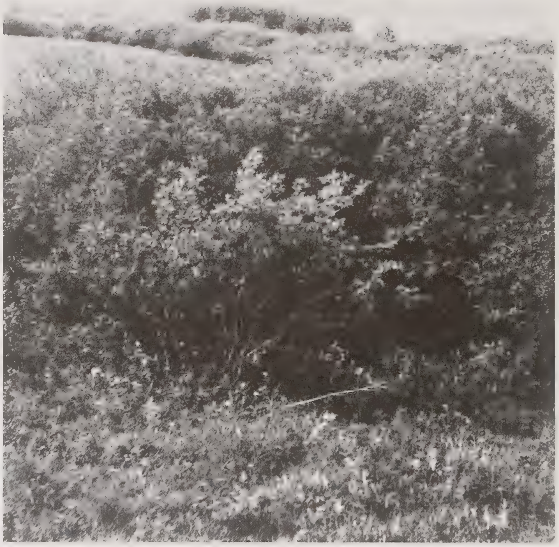

Figure 24. Woodland pasture: carrying capacity — 3.8 acres per AUM. The cover is mostly willow, aspen, and poplar with frequent small areas of grassland of the fescue prairie type.

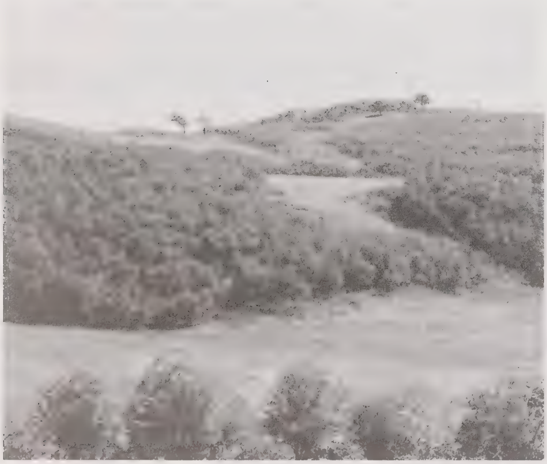

Figure 23. Woodland pasture: carrying capacity — 3.3 acres per AUM. Willow, aspen, and poplar make up from 59 to 75 per cent of the area available for grazing. The remainder is open grassland of the fescue prairie type.

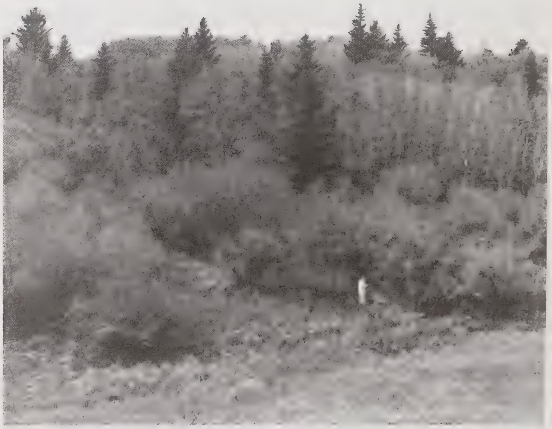

Figure 25. Woodland pasture: carrying capacity — 4.2 acres per AUM. Cover consists of willow, aspen, poplar, and scattered pine and spruce with an understory of hairy wild rye, blue grasses, vetch and peavine.

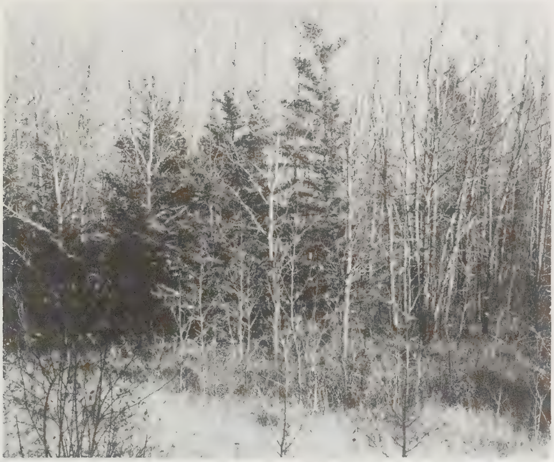

Figure 26. Woodland pasture: carrying capacity — 4.7 acres per AUM. Cover consists of some willow, aspen, and poplar with frequent pine and spruce with an understory of hairy wild rye, blue grasses, vetch and peavine.

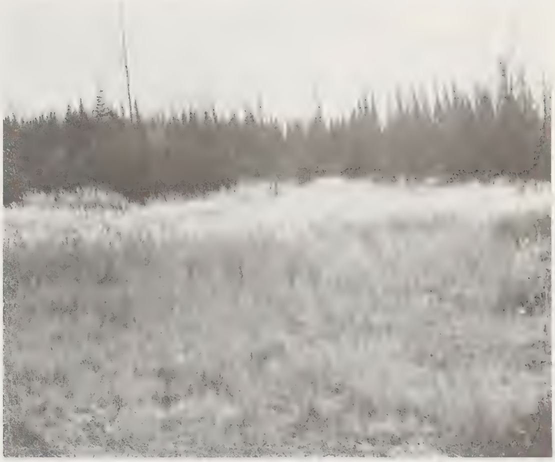

Figure 28. Woodland pasture: carrying capacity — 5.0 to 10.0 acres per AUM. Heavily wooded northern pastures with frequent areas of muskeg, occasional open patches of marsh reed grass and sedges.

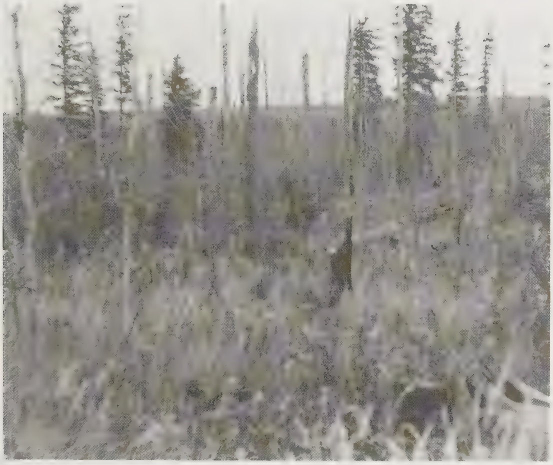

Figure 27. Woodland pasture: carrying capacity — 5.0 acres per AUM. Cover consists of fairly heavy stands of pine and spruce with an understory of pine grass, hairy wild rye and blue grasses.

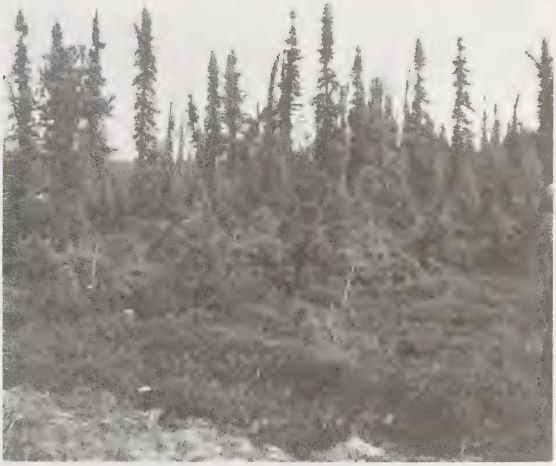

Figure 29. Woodland pasture: carrying capacity — unusable. Muskeg, organic soils of low value; vegetation consists of low shrubs and some trees (black spruce) with an understory of mosses. Of limited value where the peat is shallow.

Miscellaneous Pastures

There are many other kinds of pastures. Some common types — wetlands, abandoned lands, and badlands — are illustrated in figures 30 - 32.

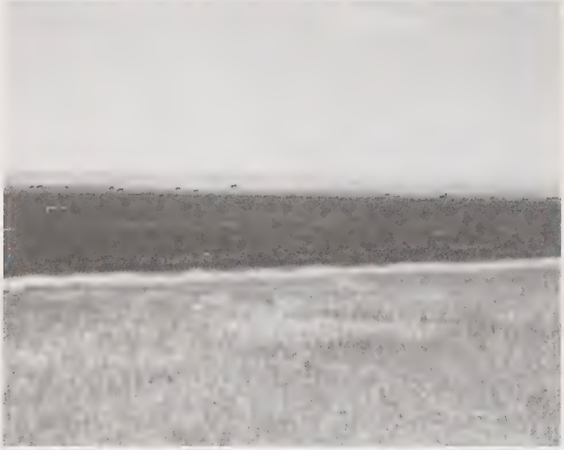

Figure 30. Wetlands: the most productive natural wetland pastures are those that are sub-irrigated or flooded occasionally. They can usually be stocked at from 0.5 to 1.5 acres per AUM.

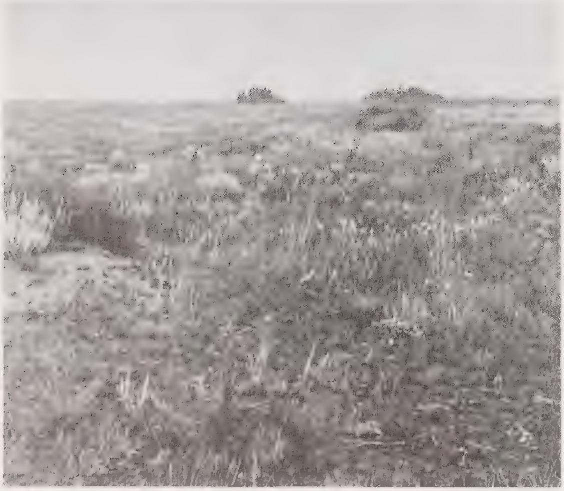

Figure 31. Abandoned lands: formerly cultivated lands that have been allowed to go back to grass. Cover is still mostly weeds and carrying capacity is very low — from 6 to 15 acres per AUM. These areas should be seeded to a cultivated grass.

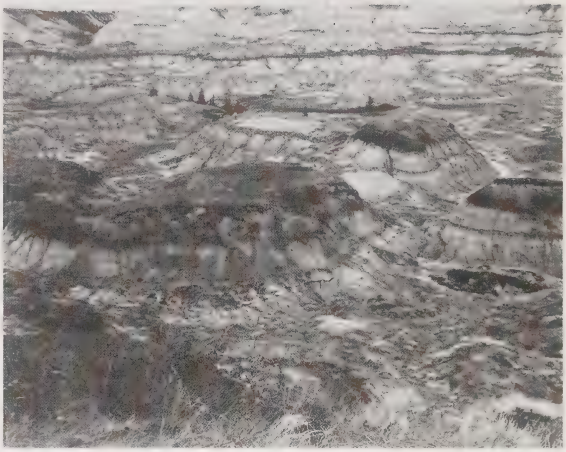

Figure 32. Badlands: nearly barren lands with a very low pasture potential. These are most useful for protection from winter storms.

COMMON AND SCIENTIFIC NAMES OF PLANTS MENTIONED

Common	Scientific
Grasses	
Awned wheat grass	*Agropyron subsecundum*
Blue grama	*Bouteloua gracilis*
Bluegrass	*Poa* spp.
Canada wild rye	*Elymus canadensis*
Cheat grass	*Bromus tectorum*
Columbia needle grass	*Stipa columbiana*
Fowl blue grass	*Poa palustris*
Foxtail barley	*Hordeum jubatum*
Glaucous blue grass	*Poa glauca*
Green needle grass	*Stipa viridila*
Hairy wild rye	*Elymus innovatus*
Hooker's oat grass	*Helictotrichon hookeri*
Idaho fescue	*Festuca idahoensis*
Intermediate oat grass	*Danthonia intermedia*
June grass	*Koeleria cristata*
Kentucky blue grass	*Poa pratensis*
Marsh reed grass	*Calamagrostis canadensis*
Mountain brome	*Bromus marginatus*
Narrow reed grass	*Calamagrostis neglecta*
Needle grass	*Stipa* spp.
Needle-and-thread	*Stipa comata*
Nodding brome	*Bromus anomalus*
Northern bent grass	*Agrostis borealis*
Northern reed grass	*Calamagrostis inexpansa*
Northern wheat grass	*Agropyron dasystachyum*
Nuttall's alkali grass	*Puccinellia nuttalliana*
Parry oat graas	*Danthonia parryi*
Pine grass	*Calamagrostis rubescens*
Plains reed grass	*Calamagrostis montanensis*
Prairie muhly	*Muhlenbergia cuspidata*
Reed canary grass	*Phalaris arundinaoea*
Rice grass	*Oryzopsis* spp.
Richardson needle grass	*Stipa richardsonii*
Rough fescue	*Festuca scabrella*
Rough hair grass	*Agrostis scabra*
Sand grass	*Calamovilfa longifolia*
Sandberg's blue grass	*Poa secunda*
Slender wheat grass	*Agropyron trachycaulum*
Smooth brome	*Bromus inermis*
Spangletop	*Scolochloa festucacea*
Sweet grass	*Hierochloe odorata*
Tall manna grass	*Glyceria grandis*
Timothy	*Phleum pratense*
Tufted hair grass	*Deschampsia caespitosa*
Water foxtail	*Alopecurus geniculatus*
Western porcupine grass	*Stipa spartea var. curtiseta*
Western wheat grass	*Agropyron smithii*
Wheat grass	*Agropyron* spp.
Sedges and Rushes	
Baltic rush	*Junous balticus*
Beaked sedge	*Carex rostrata*
Sedge	*Carex* spp.
Sun-loving sedge	*Carex heliophila*
Thread-leaved sedge	*Carex filifolia*
Forbs, Shrubs, and Trees	
Alder	*Alnus* spp.
Aspen	*Populus tremuloides*
Aster	*Aster* spp.
Balsam poplar	*Populus balsamifera*
Bearberry	*Arctostaphylos uva-ursi*
Black spruce	*Picea mariana*
Bog cranberry	*Oxycoccus quadripetalus*
Broomweed	*Gutierrezia sarothrae*
Bunchberry	*Cornus canadensis*
Cactus	*Opuntia* spp.
Canada thistle	*Cirsium arvense*
Chokecherry	*Prunus virginiana*
Cinquefoil	*Potentilla* spp.
Common plantain	*Plantago major*
Creeping juniper	*Juniperus horizontalis*
Dandelion	*Taraxacum officinale*
Dewberry	*Rubus pubescens*
Doqwood	*Cornus stolonifera*
Goat's-beard	*Tragopogon dubius*
Golden-bean	*Thermopsis rhombifolia*
Goldenrod	*Solidago* spp.
Goosefoot	*Chenopodium* spp.
Greasewood	*Sarcobatus vermiculatus*
Gumweed	*Grindelia squarrosa*
Hazelnut	*Corylus* spp.
Hedysarum	*Hedysarum* spp.
Honeysuckle	*Lonicera* spp.
Jack pine	*Pinus banksiana*
Labrador tea	*Ledum palustre*
Larkspur	*Delphinium* spp.
Leafy spurge	*Euphorbia esula*
Little club moss	*Selaginella densa*
Low-bush cranberry	*Viburnum edule*
Low juniper	*Juniperus communis*
Milk-vetch	*Astragalus* spp.

COMMON AND SCIENTIFIC NAMES OF PLANTS MENTIONED

Common Forbs, Shrubs, and Trees	Scientific
Moss phlox	*Phlox hoodii*
Nodding onion	*Allium cernuum*
Northern bedstraw	*Galium boreale*
Nuttall's atriplex	*Atriplex nuttallii*
Old man's whiskers	*Geum triflorum*
Pasture sage	*Artemisia frigida*
Peavine	*Lathyrus* spp.
Peppergrass	*Lepidium* spp.
Plantain	*Plantago* spp.
Poplar	*Populus* spp.
Pine	*Pinus* spp.
Prairie crocus	*Anemone patens*
Pussytoes	*Antennaria* spp.
Rose	*Rosa* spp.
Russian thistle	*Salsola kali*
Sagebrush	*Artemisia cana*
Saskatoon	*Amelanchier alnifolia*
Scarlet mallow	*Sphaeralcea coccinea*
Scurf pea	*Psoralea lanceolata*
Shrubby cinquefoil	*Potentilla fruticosa*
Silverweed	*Potentilla anserina*
Silvery lupine	*Lupinus argenteus*
Solomon's-seal	*Smilacina racemosa*
Sow thistle	*Sonchus arvensis*
Stinkweed	*Thlaspi arvense*
Tamarack	*Larix laricini*
Vetch	*Vicia* spp.
Western snowberry	*Symphoricarpos occidentalis*
White birch	*Betula papyrifera*
White spruce	*Picea glauca*
Whitetop	*Erigeron annuus*
Willow	*Salix* spp.
Winter fat	*Eurotia lanata*
Wintergreen	*Pyrola* spp.
Wolf-willow	*Elaeagnus commutata*
Yarrow	*Achillea millefolium*

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